भारतीय मानक **IS 12669 (Part 1) : 2023**

Indian Standard

बल्क हैंडलिंग उपस्कर – द्रवचालित उत्खनक – चयन के लिए आंकड़ा पत्र

भाग 1 होई

(पहला पुनरीक्षण)

Bulk Handling Equipment — Hydraulic Excavator — Data Sheet for Selection

Part 1 Hoe

(First Revision)

ICS 53.040.01

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June 2023 **Price Group 7**

Earth Moving Equipment and Material Handling Sectional Committee, MED 07

FOREWORD

This Indian Standard (Part 1) (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Earth Moving Equipment and Material Handling Sectional Committee had been approved by the Mechanical Engineering Division Council.

This standard was originally issued in 1989. The present revision has been taken up with a view to incorporating the modifications found necessary as a result of experience gained in the use of this standard. Also, in this revision, the standard has been brought into latest style and format of Indian Standards, and references to Indian Standards, wherever applicable have been updated.

This standard is expected to provide a uniform method of specifying dimensional and other technical requirements for hydraulic excavator with hoe attachment by the manufacturer. It is felt that a uniform method of presenting the data may greatly facilitate the user to select a suitable machine for the job.

The composition of the committee responsible for the formulation of this standard is listed in Annex A.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 ‘Rules for rounding off numerical values (*second revision*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

BULK HANDLING EQUIPMENT — HYDRAULIC EXCAVATOR — DATA SHEET FOR SELECTION

PART 1 HOE

(First Revision)

1 SCOPE

1.1 This standard covers requirements of data required for selection of hydraulic excavator with hoe attachment and having diesel engine as the prime mover.

1.2 This standard does not apply to barge mounted excavator.

2 DATA TO BE SUPPLIED BY THE MANUFACTURER

2.1 The following data shall be supplied by the manufacturer:

a) Name …………………………………………………………………………………….………….…………..…

b) Model ………………………………………………………………………………….…..…….…….…………..….

c) Operating mass of machine (*see* Note 1) …………………………………………..……..…..…….…………..…. kg

d) Bucket capacity ……………………..……..……………………………………..…...………….…………..… m^3

e) Main dimensions of complete machine shall be as given in Fig. 1.

f) Shipping weight …………………………………………………………..…...…………………….…………..…

NOTES

1 Operating mass of machine refers to that with a standard boom, stick, bucket, etc.

2 In case machine is offered with different combination of boom and arms, the dimensions of basic machine without attachment shall be given and these shall also be given for the machine with different attachments to help transportation personal. It shall, however, be ensured that under the worst operating conditions, the stability of machine shall not be less than one.

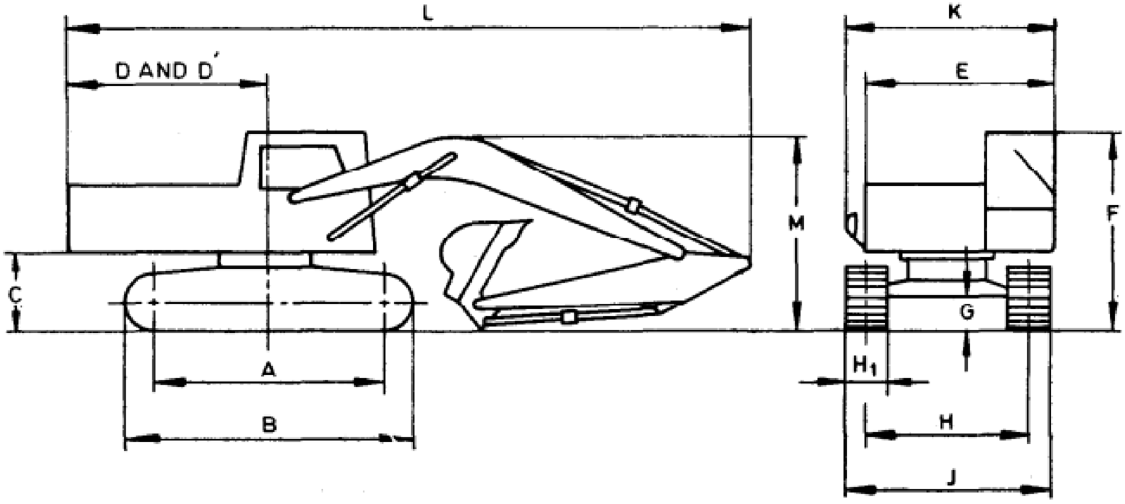
3 DETAILS OF SUB-SYSTEMS

3.1 Power Unit (Diesel Engine)

a) Make and model ………………………………………………………………………………………………

b) Type ……………………………………………………………………… Inline/V-type, Two stroke/Four stroke

c) Cooling system ………………………………………………………………………… Air cooled/Water cooled



A = Distance between tumblers
B = Undercarriage length
C = Counterweight clearance
D' = Rear-end length
D = Rear-end swing radius
E = Overall width of superstructure
F = Overall height of cab

G = Minimum ground clearance
H = Track gauge
H_1 = Track shoe width
J = Undercarriage width
K = Overall width
L = Overall length
M = Overall height of boom

FIG. 1 MAIN DIMENSIONS OF BACK HOE

d) Gross power ……………………………………… kW at ……………………………………… rev/min

e) Flywheel power ……………………………………… kW at ……………………………………… rev/min

f) Maximum torque ……………………………………… Nm at ……………………………………… rev/min

g) Specific fuel consumption (SFC) (SFC curve to be provided at rated load and speed) ……………………………………………………………………………………………… g/kWh

h) Nature of aspiration ……………………………………… Natural/Supercharged/Turbo-charged/Any other

j) Number of cylinders ………………………………………………………………………………………

k) Bore (mm) × stroke (mm) …………………………………………………………………………………

m) Displacement ……………………………………………………………………………………… liters

n) Type of fuel used …………………………………………………………………………………………

p) Type of fuel pump …………………………………………………………………………………………

q) Air cleaner type ……………………………………………………………………………………………

r) Air filtration system: Type ………………………………………………………………………… Dry/Wet

s) Air cleaner service indicator ……………………………………………………… Provided/Not provided

t) Net weight (dry) ……………………………………………………………………………………………… kg

u) Type of governing ……………………………………………………………………………………………

v) Derating factor ………………………………………………………………………………………………

w) Position of engine ……………………………………………………………………………… Front/Rear/Centre

y) Starting system ………………………………………………………………………………………………

z) Electrical system voltage ……………………………………………………………………………………… V

NOTE — In case of super-charged and turbo-charged engines, derating factor shall be specified by the manufacturer.

3.2 Hydraulic System

3.2.1 *Hydraulic Pumps*

a) Number and type of main pumps ……………………………………………………………………………

b) Maximum flow of main pumps ………………………………………………………………………………

c) Number and type of auxiliary pumps ………………………………………………………………………

d) Maximum flow of auxiliary pumps …………………………………………………………………………

3.2.2 *Hydraulic Cylinders*

(1)	*Quantity* (2)	*Bore × Rod diameter × Stroke* *mm* (3)
i) Boom		
ii) Arm		
iii) Bucket		

3.2.3 *Hydraulic Tank* ……………………………………………… Pressurized/Non-pressurized/Partially pressurized

3.2.4 *Relief Valve Settings*

a) Main relief valve ………………………………………………………………………………………………

b) Secondary/overload relief valves ……………………………………………………………………………

c) Boom circuit ……………………………………………………………………………………………………

d) Arm circuit ……………………………………………………………………………………………………

e) Bucket circuit …………………………………………………………………………………………………

f) Swing circuit ……………………………………………………………………………………………………

g) Travel circuit ……………………………………………………………………………………………………

3.2.5 *Hydraulic Filters* (*Filtering Quality and Numbers*)

a) Type (paper, wire mesh, etc) …………………………………………………………………………………

b) Filtering quality (μ) ……………………………………………………………………………………………

c) Number of filters ………………………………………………………………………………………………

3.4 Controls

a) Type (mechanical, pilot operated, etc) ……….…….……………………..………… If pilot operated, type of pilot operation……………………………………….…………..…………..…Hydraulic/Electrical/Other (specify).

b) Number of control levers …………………………….…………..………………...…………………………..

c) Actuation diagram/details (*see* Fig. 2) ………………….…………..……………………………………..……..

3.4 Superstructure

a) Swing mechanism ………………………………….…………..……………………………………………

b) Motor type ………………………………….…………..……………………………………………………...

c) Gear box type ………………………………….…………..…………………………………………………..

d) Slew bearing type ………………………………….…………..……………………………………………....

e) Slew speed …………………………………………….…………..…………………………………... rev/min

f) Swing lock type ………………………………….…………..…………………………………………...…

g) Braking system of motor

1) Number ……………………………………….…………..……..……………………………………………….

2) Type ……………………………………….…………..……..……………………………………………….

3.5 Operation Cab

Brief description of cab, glass windows, operator’s seat, rock guard, etc, shall be given.

3.6 Undercarriage

Brief description of style of track frames-welded or bolted, etc, track chain, rollers, shoes, etc, shall be given.

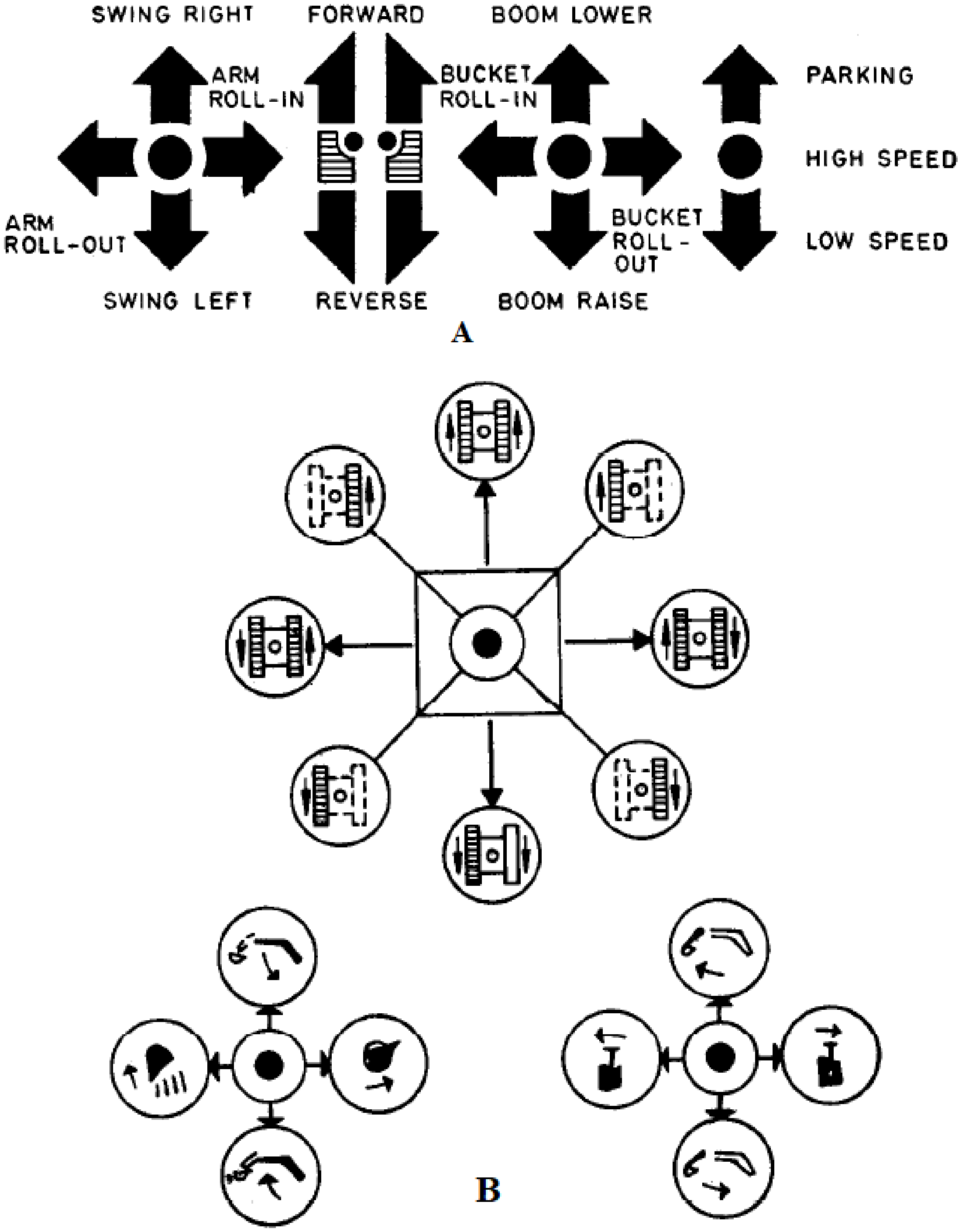


FIG. 2 TYPICAL ACTUATION DIAGRAMS

3.6.1 Following information shall also be given:

a) Type of shoe ……………………………………………………………………………………………………

b) Shoe width and their number ……………………………………………………………………………………

c) Number of lower rollers ………………………………………………………………………………………

d) Number of upper rollers ………………………………………………………………………………………

e) Ground pressure …………………………………………………………………………………………… kPa

3.7 Traction

a) Type of propel motor, gear box and braking ……………………………………………………………………

b) Maximum tractive effort ……………………………………………………………………………………… kN

c) Gradeability (continuous)

   1) Percent ………………………………………………………………………………………………………

   2) Degrees ………………………………………………………………………………………………………

d) Travel speed (km/h)

   1) High ……

   2) Low ……

4 ATTACHMENT

a) Length of booms, arm ……………………………………………………………………………………………

b) Digging forces (maximum radial force at tooth) with bucket cylinder and with arm cylinder for different arm/boom combinations ……………………………………………………………………………………………

c) Type of booms …………………………………………………… One piece/Adjustable two piece/Other (specify).

4.1 Bucket

a) Capacity …………………………………………………………………………………………………… m^3

b) Width ……

c) Weight ………

d) Recommendation (namely, suitability for different arm/boom and material to be dug)… …………………………… ……

e) Teeth ……………………………………………………………………………………………Fixed/Replaceable

5 MASS AND GROUND PRESSURE

Operating mass and ground pressure with different combinations of arms/buckets/shoes, etc, shall be given.

6 SERVICE REFILL CAPACITIES (*l*)

a) Fuel tank ……………………………………………………………………………………………………

b) Hydraulic oil tank ……………………………………………………………………………………………

c) Hydraulic oil system …………………………………………………………………………………………

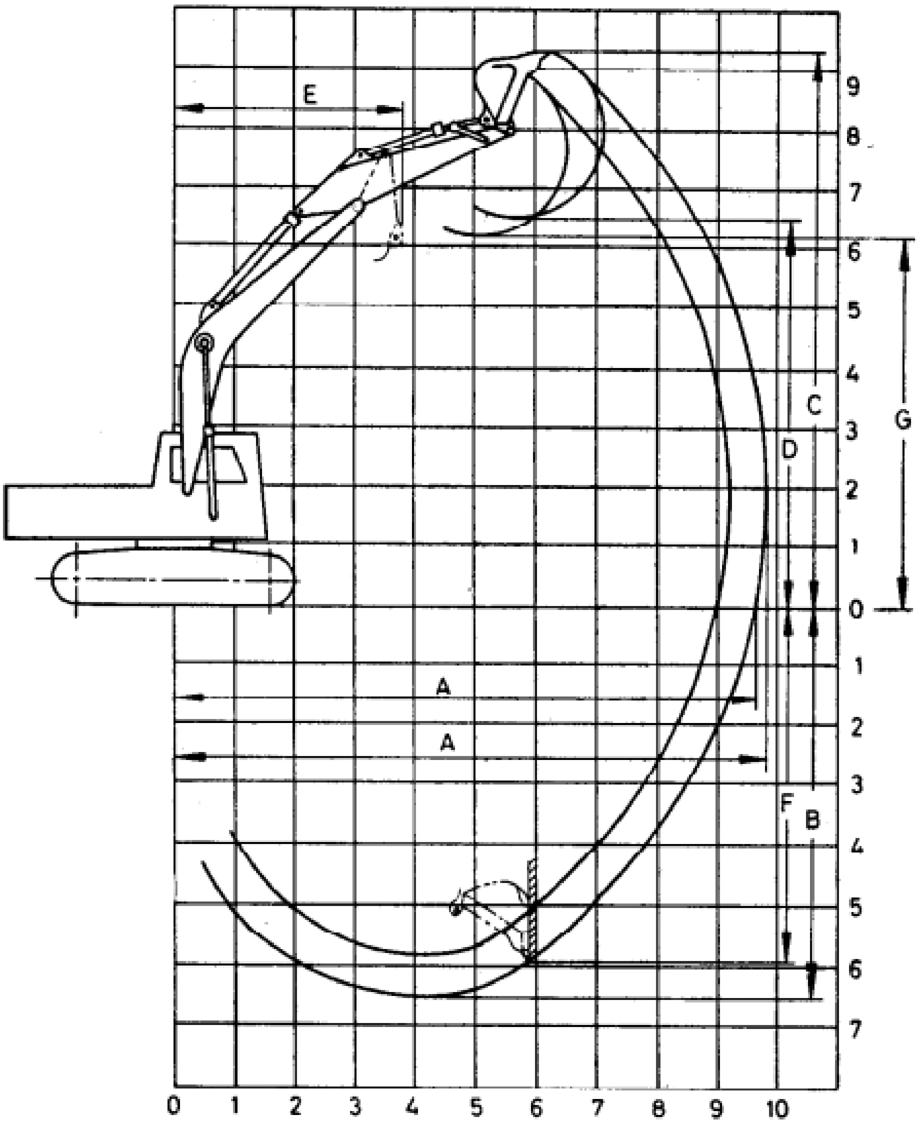
d) Engine oil …………………………………………………………………………………………………

e) Different gear boxes …………………………………………………………………………………………

f) Coolant capacity ……………………………………………………………………………………………

7 WORKING RANGE

Complete range diagram of machine with different arm/boom, etc, combination shall be given, similar to that illustrated in Fig. 3.



A = Maximum digging reach
A'= Maximum digging reach (on ground)
B = Maximum digging depth
C = Maximum cutting height
D = Maximum dumping height
E = Maximum swing radius
F = Maximum vertical wall
G = Vertical height at minimum swing radius

FIG.3 TYPICAL DIAGRAM OF WORKING RANGES

8 LIFTING CAPACITIES

In case, back hoe is to be allowed for lifting purposes, such as, pipe laying, the maximum safe lifting capacity with different arm/boom combination for different operating radii, swing position and basis shall be given. The information may be given with bucket and without bucket as illustrated in Table 1.

Table 1 Lifting Capacities
(*Clause* 8)

Sl No.	**Lift Point Height** mm	**Lift Radius** mm **Rated lift Capacity Over End** kg					**Minimum Radius Lift Capacity**
		r_1	r_2	r_3	r_4	… r_n	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
i)	+ h_n						
ii)	ground						
iii)	– h_n						
		Rated lift capacity over side, kg					
iv)	+ h_n						
v)	ground						
vi)	– h_n						

9 WHEEL MOUNTED BACK HOE

9.1 In case of wheel mounted back hoe, the following information shall be given:

a) Number of wheels and axles and driven axles ……………………………………………………………………

b) Tyre sizes ……………………………………………………………………………………………………

c) Tyre pressure …………………………………………………………………………………………………

d) Number of speeds and type of drive (for example, individual wheels driven/crown wheel/pinion driven) ………

e) Type of out riggers ……………………………………………………………………………………………

f) Maximum travel speed ………………………………………………………………………………………

g) Maximum traction force ……………………………………………………………………………………

h) Gradeability (percent) ………………………………………………………………………………………

j) Steering system (linkage/hydraulic assisted/hydraulic) ……………………………………………………

k) Minimum turning radius ……………………………………………………………………………………

9.2 Dimensional Details

In addition to main dimensional details as in **2.1**(e), dimensional details with a sketch shall be given to replace the crawler mounted sketch in case of wheel mounted back hoe.

9.3 Following details shall also be given:

a) Carrier frame specification ……………………………………………………………………
b) Wheel base…………………………………………………………………………………
c) Width………………………………………………………………………………………
d) Type of axle — Front: Floating/rigid……………………………………………………………
Rear: Floating/rigid……………………………………………………………
e) Degree of axle oscillation ……………………………………………………………………

10 SAFETY

Following features with information shall be provided:

a) Swing lock for use during transportation ……………………………………………………
b) Air horn……………………………………………………………………………………
c) Back-up alarm………………………………………………………………………………
d) Cat walk non-stop steps and handrails ………………………………………………………
e) Headguard…………………………………………………………………………………

11 OPTONAL/SPECIAL ATTACHMENTS/ANY OTHER FEATURES

When required by the purchaser, optional/special attachments/any other features shall be provided and for these, information shall be given.

ANNEX A

(*Foreword*)

COMMITTEE COMPOSITION

Earth Moving Equipment and Material Handling Sectional Committee MED 07

Organization	*Representative(s)*
BEML Limited, Bengaluru	Shri V. Sekar **(*Chairperson*)**
Airports Authority of India, New Delhi	Shri K. S. Kunwar Shri Jaspal Singh (*Alternate*)
Automotive Research Association of India, Pune	Shri A. Akbar Badusha
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Indian Institute of Technology (ISM), Dhanbad	Prof L. A. Kumaraswamidhas

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L & T Komatsu Limited	Shri G. S. Narayana Shri K. Keshava (*Alternate*)
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Amendments Issued Since Publication

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